

CLAIMS

1. A polynucleotide selected from the group consisting of:
 - (a) a polynucleotide that encodes a polypeptide comprising the
5 amino acid sequence of SEQ ID NO: 2 or 19; and
 - (b) a polynucleotide that comprises a coding region of the
nucleotide sequence of SEQ ID NO: 1 or 18.
2. A polynucleotide comprising galactose transferring activity,
10 selected from the group consisting of:
 - (c) a polynucleotide that encodes a polypeptide comprising the
amino acid sequence of SEQ ID NO: 2 or 19, wherein one or more
amino acids are substituted, deleted, added, and/or inserted;
and
 - 15 (d) a polynucleotide that hybridizes with a DNA comprising the
nucleotide sequence of SEQ ID NO: 1 or 18 under stringent
conditions.
3. A polynucleotide that encodes a fragment of a polypeptide
20 comprising the amino acid sequence of SEQ ID NO: 2 or 19.
4. A vector that comprises the polynucleotide of any one of
claims 1 to 3.
- 25 5. A host cell that comprises the polynucleotide of any one of
claims 1 to 3 or the vector of claim 4.
6. A polypeptide encoded by the polynucleotide of any one of
claims 1 to 3.
- 30 7. A method for producing the polypeptide of claim 6, which
comprises the steps of:
culturing the host cell of claim 5; and
recovering the polypeptide produced from the host cell or the
35 culture supernatant of the same.

8. An antibody that binds to the polypeptide of claim 6.

9. A pharmaceutical composition for treating a patient who requires an increase in the activity or expression of the polypeptide of claim 6, wherein the composition comprises a therapeutically effective amount of a molecule selected from the group consisting of:

- (a) the polynucleotide of any one of claims 1 to 3;
- (b) the vector of claim 4; and
- (c) the polypeptide of claim 6.

10. A pharmaceutical composition for treating a patient who requires suppression of the activity or expression of the polypeptide of claim 6, wherein the composition comprises a therapeutically effective amount of a molecule selected from the group consisting of:

- (a) the antibody of claim 8; and
- (b) a polynucleotide that suppresses the expression of an endogenous gene encoding the polypeptide of claim 6 *in vivo*.

11. A method of screening for a candidate therapeutic compound for a disease related to abnormal expression of a gene encoding the polypeptide of claim 6, or abnormal activity of the polypeptide of claim 6, which comprises the steps of:

- (a) contacting a test compound with the polypeptide of claim 6;
- (b) measuring the galactose transferring activity of the polypeptide of claim 6; and
- (c) selecting a compound that changes the galactose transferring activity, compared to when the test compound is not contacted.

12. A method of testing for a disease related to abnormal expression of a gene encoding the polypeptide of claim 6, or abnormal activity of the polypeptide of claim 6, which comprises the step of detecting a mutation in the gene or its expression control region, in a patient.

13. The method of claim 12, which comprises the steps of:
(a) preparing a DNA sample from a subject;
(b) isolating a DNA that encodes the polypeptide of claim 6 or
5 its expression control region;
(c) determining the nucleotide sequence of the isolated DNA;
and
(d) comparing the nucleotide sequence of the DNA of step (c)
with that of a control.

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14. The method of claim 12, which comprises the steps of:
(a) preparing a DNA sample from a subject;
(b) cleaving the prepared DNA sample with a restriction enzyme;
(c) separating the DNA fragments by size; and
15 (d) comparing the size of the detected DNA fragments with that
of a control.

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15. The method of claim 12, which comprises the steps of:
(a) preparing a DNA sample from a subject;
(b) amplifying a DNA that encodes the polypeptide of claim 6 or
its expression control region;
(c) cleaving the amplified DNA with a restriction enzyme;
(d) separating the DNA fragments by size; and
(e) comparing the size of the detected DNA fragments with that
25 of a control.

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16. The method of claim 12, which comprises the steps of:
(a) preparing a DNA sample from a subject;
(b) amplifying a DNA that encodes the polypeptide of claim 6 or
its expression control region;
(c) dissociating the amplified DNA into a single strand DNA;
(d) separating the dissociated single strand DNA on non-
denaturing gel; and
(e) comparing the mobility of the separated DNA on the gel with
35 that of a control.

17. The method of claim 12, which comprises the steps of:

- (a) preparing a DNA sample from a subject;
- (b) amplifying a DNA that encodes the polypeptide of claim 6 or its expression control region;
- 5 (c) separating the amplified DNA on a gel that comprises a gradually increasing concentration of a DNA denaturant; and
- (d) comparing the mobility of the separated DNA on the gel with that of a control.

10 18. A method of testing for a disease related to abnormal expression of a gene encoding the polypeptide of claim 6, which comprises the step of detecting the expression level of the gene in a subject.

15 19. The method of claim 18, which comprises the steps of:

- (a) preparing an RNA sample from a subject;
- (b) measuring the amount of RNA that encodes the polypeptide of claim 6 comprised in the RNA sample; and
- (c) comparing the measured amount of RNA with that of a control.

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20. The method of claim 18, which comprises the steps of:

- (a) providing a cDNA sample prepared from a subject, and a board on which a nucleotide probe that hybridizes with a DNA encoding the polypeptide of claim 5 is immobilized;

25 (b) contacting the cDNA sample with the board;

- (c) measuring the expression level of a gene encoding the polypeptide of claim 5 comprised in the cDNA sample, by detecting the intensity of hybridization between the cDNA sample and the nucleotide probe immobilized on the board; and

30 (d) comparing the measured expression level of the gene encoding the polypeptide of claim 6 with that in a control.

21. The method of claim 18, which comprises the steps of:

- (a) preparing a protein sample from a subject;

35 (b) measuring the amount of the polypeptide of claim 6 comprised in the protein sample; and

(c) comparing the measured amount of the polypeptide with that of a control.

22. The method of any one of claims 12 to 21, wherein the
5 disease is IgA nephropathy or Tn syndrome.

23. An oligonucleotide comprising at least 15 nucleotides that
hybridizes with a DNA encoding the polypeptide of claim 6 or an
expression control region thereof.
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24. A drug comprising the oligonucleotide of claim 23, for
testing for a disease related to abnormal expression of a gene
encoding the polypeptide of claim 6, or abnormal activity of the
polypeptide of claim 6.
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25. A pharmaceutical comprising the antibody of claim 8, for
testing for a disease related to abnormal expression of a gene
encoding the polypeptide of claim 6, or abnormal activity of the
polypeptide of claim 6.
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26. The pharmaceutical of claim 24 or 25, wherein the disease
is IgA nephropathy or Tn syndrome.

27. A genetically altered non-human animal wherein the
25 expression of ClGal-T2 protein is artificially altered.

28. A genetically altered non-human animal into which an
exogenous polynucleotide that encodes ClGal-T2 protein has been
introduced.
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29. The genetically altered non-human animal of claim 27 or 28,
wherein the non-human animal is a mouse.

30. A cell established from the genetically altered non-human
35 animal of any one of claims 27 to 29.

31. A method of screening for a compound that changes the activity of ClGal-T2 protein, which comprises the steps of:

- (a) administering a test compound to the genetically altered non-human animal of any one of claims 27 to 29, or contacting
5 the test compound with the cell of claim 30;
- (b) measuring the activity or expression level of ClGal-T2 protein in the genetically altered non-human animal or the cell; and
- (c) selecting a compound that changes the activity or
10 expression level of ClGal-T2 protein by comparison with activity in the absence of the test compound.